

## Eastern Equine Encephalitis (EEE) in Massachusetts

### An Update for Health Care Providers

Massachusetts Department of Public Health (MDPH)  
Division of Epidemiology and Immunization

#### **Background**

EEE virus is the most neuropathogenic arbovirus in the United States. The mortality rate for those affected is high and survivors often suffer severe neurological damage. The first case of human EEE in the United States was identified in Massachusetts in 1938. EEE is relatively rare, with 84 human cases being reported in Massachusetts between 1938 and 2005. EEE is endemic in eastern and southern Massachusetts, specifically Plymouth, Bristol, Norfolk, Suffolk, and Middlesex counties. The time of highest risk for EEE is from late July through September. People under 15 years of age or over 50 years of age are at greatest risk for serious illness.

#### EEE in Massachusetts by Year, 1938-2005\*

Year(s)	Number of Human Cases	Number of Deaths
1938-39	35	25
1955-56	16	9
1970	1	0
1973-75	6**	4
1982-84	10***	3
1990	3	1
1992	1	0
1995	1	1
1997	1	0
2000	1	0
2001	1	0
2004	4	2
2005	4	2
<b>TOTAL</b>	<b>84</b>	<b>47</b>

\* Years not shown had no reported cases.

\*\* One case in 1973 consistent with exposure in NH

\*\*\* One case in 1984 consistent with exposure in NJ

#### **When to Suspect EEE**

Central nervous system infection with EEE virus most commonly presents as encephalitis. The symptoms may present acutely or sub-acutely, but typically include fever, headache, alterations of consciousness, lethargy, confusion and seizures. Since encephalitis can coexist with inflammation of the meninges, symptoms of meningitis, such as headache and stiff neck, may predominate. **Suspect cases of encephalitis or meningitis should be reported as soon as possible to the MDPH, Division of Epidemiology and Immunization, at 1-617-983-6800 or 1-888-658-2850.**

#### **How and Where to Send Specimens for Testing**

To assist in confirming suspect cases of EEE, it is vital that you send the appropriate samples to the MDPH State Laboratory Institute (SLI) for testing. SLI provides diagnostic serologic (IgM and IgG) testing. Acute and convalescent (at least 10 days post-onset) sera may be necessary to confirm the diagnosis. The laboratory will also accept cerebrospinal fluid (CSF) and brain tissue specimens for viral isolation. Specimens must be kept cold on wet ice (+ 4 degrees Centigrade) prior to and during transport. In addition, CSF will be tested for the presence of antibody to EEE virus. All specimens must be accompanied by a completed Universal Specimen Submission Form, available on the MDPH arbovirus website at [www.mass.gov/dph/wnv/wnv1.htm](http://www.mass.gov/dph/wnv/wnv1.htm). **For further questions on EEE specimen submission to SLI, please call the Viral Serology Laboratory at 617-983-6396.**

#### **Prevention Messages for Patients**

There is no available human vaccine against EEE. Patients should be counseled to take the following precautions if they live in or visit an area with mosquitoes:

- Avoid outdoor activities between dusk and dawn, if possible, as this is the time of greatest mosquito activity.

- Avoid swamp or marshland areas, as these are areas where mosquitoes that transmit EEE are likely to be.
- Wear a long-sleeved shirt and long pants and take special care to cover up the arms and legs of children when outside during high-risk times or in high-risk areas.
- Fix any holes in screens and make sure they are tightly attached to all doors and windows.
- Use a repellent containing DEET (N,N-diethyl-m-toluamide) or Picaridin (KBR 3023). Oil of lemon eucalyptus [p-menthane 3,8-diol (PMD)] has been found to provide protection similar to repellents with low concentrations of DEET. In addition, products that contain permethrin are only recommended for use on clothing, shoes, bed nets, and camping gear. Note that the label for products containing oil of lemon eucalyptus specifies that they should not to be used on children under the age of three years. Also, the American Academy of Pediatrics does not recommend any repellent use on children younger than two months of age.

The following precautions are recommended when using insect repellents:

- Always apply repellents according to the instructions on the product label.
- Apply repellents only to exposed skin and/or clothing as indicated on the label. Do not use repellents under clothing.
- Never use repellents over cuts, wounds or irritated skin.
- Do not apply repellents to the eyes or mouth, and apply them sparingly around the ears. When using repellent sprays, do not spray directly on the face—spray the product on your hands first and then apply it to the face.
- Do not allow children to handle the product. When using repellents on children, apply to your hands first and then put it on the child. You should not apply repellent to children's hands.
- Use just enough repellent to cover exposed skin and/or clothing. Heavy application and saturation are generally unnecessary for effectiveness. If biting insects do not respond to a thin film of repellent, then apply a bit more.
- After returning indoors, wash treated skin with soap and water. Also, wash treated clothing before wearing it again.
- If you or your child get a rash or other bad reaction from an insect repellent, stop using the repellent, wash the repellent off with mild soap and water, and call a local poison control center for further guidance. If you go to a doctor because of the repellent, take the repellent with you to show the doctor.

In addition to personal protection measures, patients should be counseled to take steps to reduce mosquito populations around their home and neighborhood by getting rid of any standing water that is available for mosquito breeding. Mosquitoes will begin to breed in any puddle or standing water that lasts for more than four days. Homeowners should dispose of or regularly empty any metal cans, plastic containers, ceramic pots, and other water holding containers (including trash cans) on their property.

### **Further Information**

Visit the MDPH arbovirus website at [www.mass.gov/dph/wnv/wnv1.htm](http://www.mass.gov/dph/wnv/wnv1.htm) for educational information on West Nile virus and EEE for the general public, physicians, local Boards of Health, and veterinarians. You may also access current reports of WNV or EEE virus positive birds, mosquito pools, horses and humans in Massachusetts.